# CoEVOLUTION CATALOG

Oceanic azure and cirro-stratus white on interstellar black, this new CQ sweatshirt is no-shrink 50-50 cotton blend. Small (34-36), medium (38-40), large (42-44), and extra large (46-48). $16 postpaid.

4 Differences from CQ this Winter p. 2

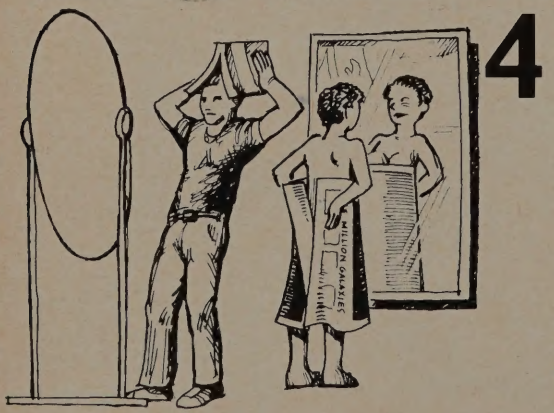
October 1982 Economic Update by Paul Hawken . p. 3

# 4 Differences from CQ this Winter

**1** *25% off the 1982* **Next Whole Earth Catalog** *(2d Edition). Till January 1, 1983, instead of $16, only $12 postpaid.*

**2** **CoEvolution** *for all tastes — a choice of subscribing to CQ Lite or CQ Dark. "Lite" is the usual 144 pages/issue of the usual panoply* **minus** *articles that some find offensive due to sexual explicitness. "Dark" is the usual ale* **including** *bolder material (and so frequently more than 144 pages). New subscriptions begin with the Winter 82/83 issue, which is standard size and, as it happens, offense-free. It features Wendell Berry (on "Standing by Words"), Paul Hawken, and an artist called Apology.*

**3** *New swift handling of orders. Two-day turnaround. Your Christmas orders can get to us as late as Dec. 18 by mail or phone (with VISA or Mastercard) and expect delivery by Dec. 25.* [For phone orders call (415) 332-1717 between 10am and 5pm Pacific Standard Time. Sorry, no collect calls.]*




**4** *A new CQ storefront at our office at 27 Gate Five Road, Sausalito, where everything you see in this catalog may be tried on. Drop by.*

*— Stewart Brand*

*Except for **Whole Earth Catalogs**, whose order deadline is Dec. 1 at the $12 price. If you add $2, the deadline extends to Dec. 18.

**We're trying something here — an article commissioned strictly for use in a promotional mailing. The shorter deadline-to-delivery delay gives the writer a shot at unusual timeliness. Because of everyone's interest in the economy these days, Hawken is the most popular contributor in *CoEvolution*'s history. In April 1983 he goes mainstream with publication by Holt, Rinehart of his book *The Next Economy* as their major spring title. His regular feature on economics in *CQ* will continue. —Stewart Brand**

# October 1982 Economic Update

*By Paul Hawken*

*THE INCENDIARY ACTION of the stock market between August and October reflects the continuing conflict between inflation and deflation. Deflation is caused by the $5.8 trillion debt the U.S. has built up over the past few decades, in particular the extraordinary build-up of debt since 1973. Why was this debt incurred? To float the economy, to maintain its solvency during a period when energy prices were forcing it into a less expansive and more conservative mode.*

*Both the Democrats and the Republicans have rejected this new mode. A long series of expansionary, deficit-ridden budgets was begun by Presidents Ford and Carter, starting in 1974 with Ford's $75 billion deficit. In the six years of their administrations, Ford and Carter managed to double the debt the United States had accumulated during the first two hundred years of the republic.*

*This new debt was intended to stimulate the economy, but it had an opposite effect. The economy went flat, and inflation roared out of control. By the first quarter of 1981 it was running 18 percent per annum. To quell mounting criticism of his fiscal and monetary policies, President Carter appointed Paul Volcker, a Republican and a monetarist, to be the new chairman of the Federal Reserve Board. Volcker promptly reversed the policies of his predecessor, Arthur Burns, and put the brakes on the growth of money.*

*Instead of the double-digit inflation and recession we experienced under Carter, we now have double-digit unemployment and a recession under President Reagan. In other words, allowing monetary growth to be moderated (although it was still growing far in excess of real economic growth) caused the economy to plunge into illiquidity, falling production, declining demand, layoffs, bankruptcies, and business failures. This path was clearly leading the U.S. toward full deflation and a credit collapse. Something had to be done, especially before the November elections.*

*Writing in March of this year for publication in the Summer '82* **CQ**, *I said that "since the economy is in part a political decision, the other alternative [to deflation] is what I would dub an 'eerie boom.' After a gloom-and-doom spring, interest rates might fall, and an economic recovery could begin which might carry us some two, maybe three years. It is eerie because, during this period, none of the basic problems of the mass economy would be dealt with." Starting in August, the Federal Reserve Bank sent very clear signals that it would start to ease off on the control of money growth as well as interest rates. This has been done by lowering the federal discount rate, the rate at which member banks can borrow from the Fed and a rate which effectively raises or lowers the prime rate, and by "monetizing" Treasury debt by buying government*

*securities. This precipitated a buying panic on Wall Street as herdish institutional money managers rushed to get out of "paper" (liquid securities) and into stocks and long-term bonds. Not long after,* **Time** *magazine put a bull on its cover for the first time in many a year. Is this the bull market of the century that so many breathless brokers have been predicting?*

*Maybe. But it is not the kind of bull market that I would put a penny into. First, it is a "trader's market" – professionals buying from professionals, which accounts for the large volume. Second, it is a panic. The mania that has seized Wall Street reflects the uncertainty and underlying confusion that exists about what is really happening to the economy. Third, it reflects fear rather than growth, fear of being left out or looking dumb as well as fear of renewed inflation.*

*Fourth, it used to be that market watchers would observe odd-lot sales, what the little guy was doing, and then do the opposite, because the little guy is almost always wrong. He buys late into rallies and sells late into bear markets. Or so the conventional wisdom goes. I take the opposite view. Now, the conventional wisdom to watch and shy away from is that of the institutions. Accounting as they do for 70 percent of the volume, they are big enough to move markets. They are too big, however, to be smart, nimble, and effective.*

*The fifth reason not to invest in this kind of bull market is that the loosening of interest rates was a political decision. Welcome as they are, lowered interest rates do not necessarily reflect a long-term policy of the Fed (Volcker is a monetarist). Also, long-term loosening of interest rates is tantamount to starting a new process of inflation because of the increases in monetary growth that will accompany it.*

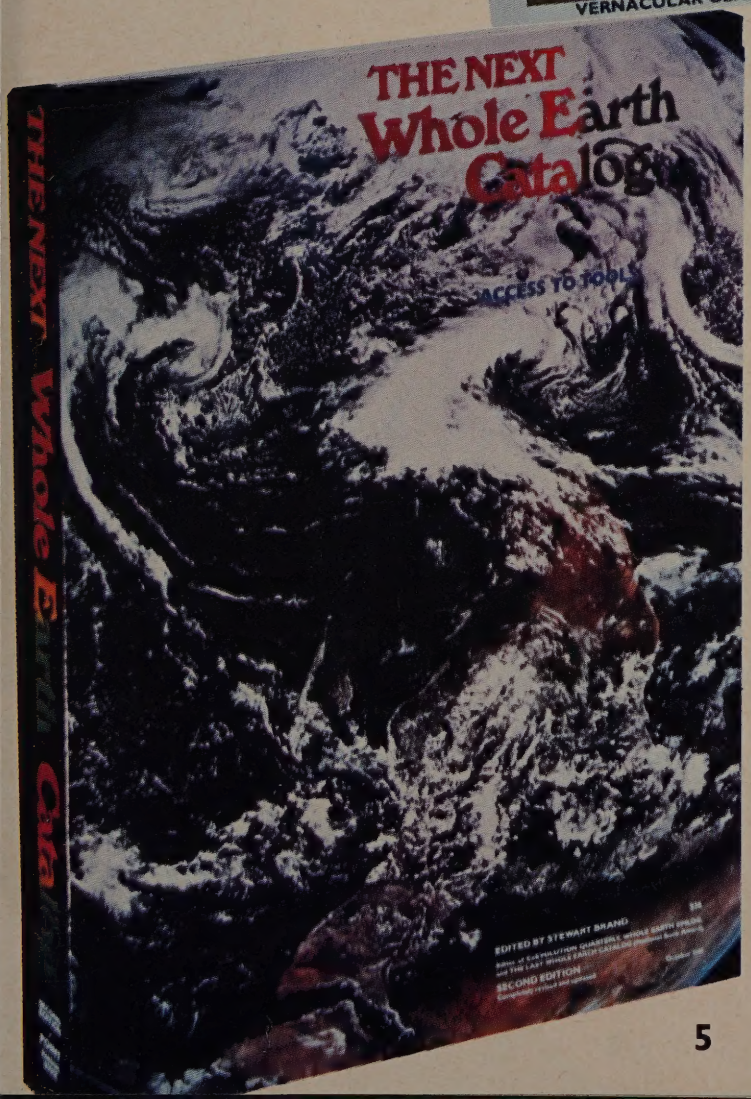
*We are in an economy that requires more debt to survive, but whose ability to sustain that debt is declining. Remember that the last time the United States had high consumer, mortgage, agricultural, and corporate debt, and over-stretched international borrowers owing large amounts to American banks, was 1928. What happened then was a furious bull market in stocks followed by a classic credit collapse. The structure of debt that had been built up at that time could no longer be sustained by the economy, and a long painful period of deflation and liquidation took place which devastated the country for a decade, causing one-fourth of all jobs to be lost, the failure of 10,000 banks, a 50 percent reduction in gross national product, and a one-third drop in wages.*

*I am not predicting such dire happenings, and yet very few adults alive today have a working memory of the events and frothy mindlessness that led up to the credit collapse and Depression. It is useful to remind ourselves that spiralling debt and ignorance of its consequences have always precipitated financial panics, collapses, and depressions. During this period, try to save money and ignore, for the time being, the gyrations of the markets. When a long economic cycle comes to an end, all markets get volatile and experience sudden spikes and declines. Keep working away at reducing your debt and increasing liquidity. As I wrote in the summer, the forces of inflation and deflation are colliding like hot and cold air, and you can expect turbulence. But we do not yet know, despite the action of the Federal Reserve Board, which of the two will dominate. Until we do, it is not prudent to invest in stock markets or any other market that depends on either inflation or deflation, especially if the investment is for short-term gains. What I wrote last March still holds true: the events of the next twelve months will surprise all of us.* ■

## CoEvolution Quarterly

CoEvolution "Lite"
**$14**/year (4 issues)
CoEvolution "Dark"
**$14**/year (4 issues)

Two-thirds conceptual news, one-third Whole-Earth-Catalog-style reviews of new stuff, 144 pages plus.




## The Next Whole Earth Catalog

2d Edition **$16**.
**$12** postpaid, till January 1, 1983

Only the best available is reviewed — 3907 items in 608 pages — on every imaginable how-to subject, covering books, magazines, and tool sources. "A perfectly splendid Catalog" (**New York Times**). "A progress report on the best practical intelligence now available" (**Manas**). "Perhaps the best single tool for surviving the '80s in style" (**Los Angeles Times**).

## LIBRARIES WILL GET YOU THROUGH TIMES OF NO MONEY BETTER THAN MONEY WILL GET YOU THROUGH TIMES OF NO LIBRARIES.

WHAT'S HAPPENING to libraries lately is like they're shooting stars out of the sky. Libraries are such unnatural, incandescent miracles and it's so easy to take little chunks out of them, like nighttime hours when people stuck doing something they don't much like the rest of the day can spend a few hours checking out the rest of the universe. Emerson said that if the stars only shone once a century everyone would be out there in awe that whole night. Libraries to me are honest to God about that weird, but they're there all the time too, so chipping away at them doesn't seem much like amputating a unicorn but they are a wondrous beast.

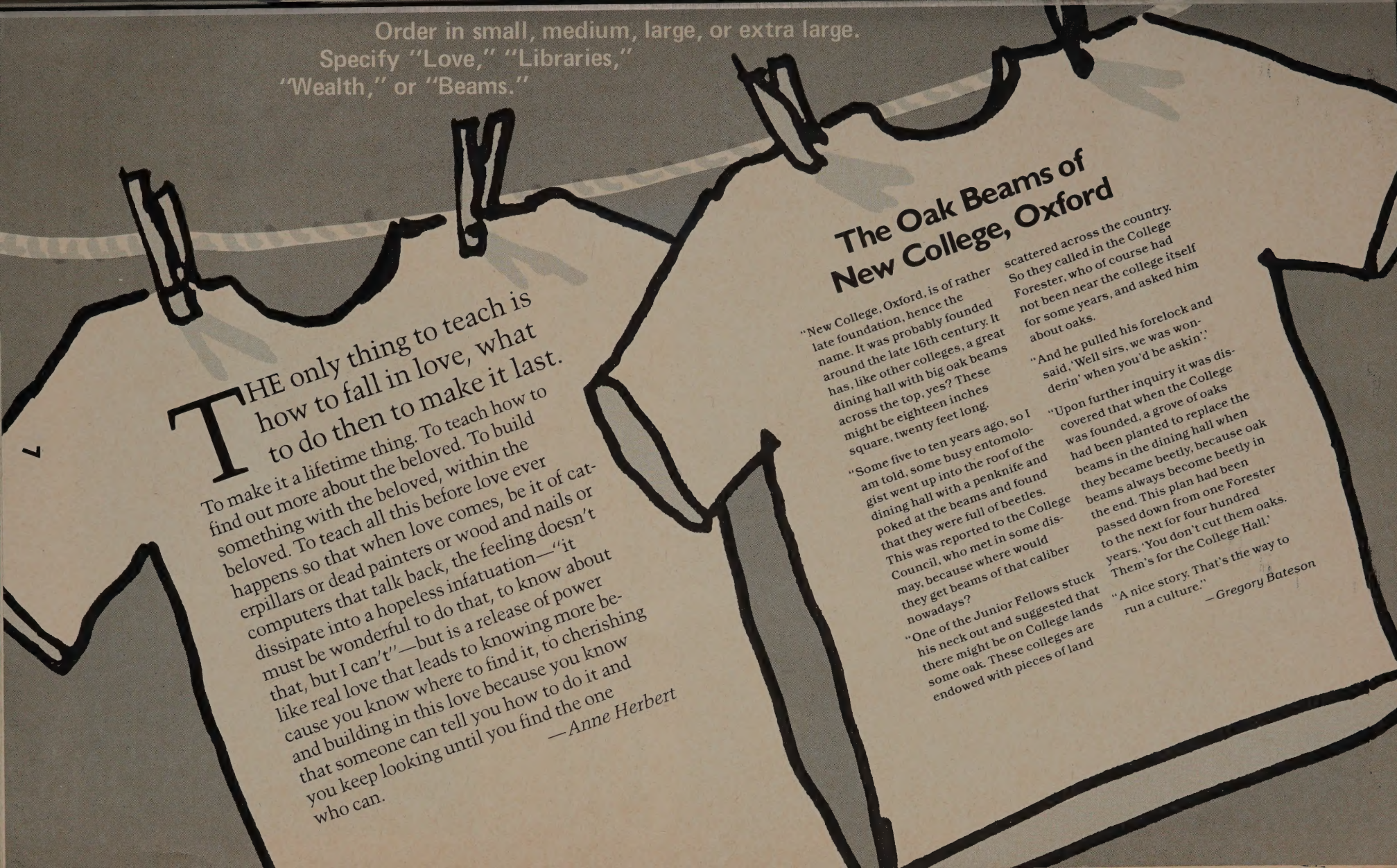
—*Anne Herbert*

IN THE COMMUNITY regulated only by laws of demands and supply, but protected from open violence, the persons who become RICH are, generally speaking, industrious, resolute, proud, covetous, prompt, methodical, sensible, unimaginative, insensitive, and ignorant. The persons who remain POOR are the entirely foolish, the entirely wise, the idle, the reckless, the humble, the thoughtful, the dull, the imaginative, the sensitive, the well-informed, the improvident, the irregularly and impulsively wicked, the clumsy knave, the open thief, and the entirely merciful, just, and godly person.

—*John Ruskin, 1862*

**New T-shirts**
**from CoEvolution — $8 postpaid**
**They are 100% unbleached undyed**
**cotton (parchment colored)**
**made heavyweight for durable ink-holding.**

Order in small, medium, large, or extra large.
Specify "Love," "Libraries,"
"Wealth," or "Beams."



THE only thing to teach is how to fall in love, what to do then to make it last.

To make it a lifetime thing. To teach how to find out more about the beloved. To build something with the beloved, within the beloved. To teach all this before love ever happens so that when love comes, be it of caterpillars or dead painters or wood and nails or computers that talk back, the feeling doesn't dissipate into a hopeless infatuation—"it must be wonderful to do that, to know about that, but I can't"—but is a release of power like real love that leads to knowing more because you know where to find it, to cherishing and building in this love because you know that someone can tell you how to do it and you keep looking until you find the one who can.

*—Anne Herbert*

## The Oak Beams of New College, Oxford

"New College, Oxford, is of rather late foundation, hence the name. It was probably founded around the late 16th century. It has, like other colleges, a great dining hall with big oak beams across the top, yes? These might be eighteen inches square, twenty feet long.

"Some five to ten years ago, so I am told, some busy entomologist went up into the roof of the dining hall with a penknife and poked at the beams and found that they were full of beetles. This was reported to the College Council, who met in some dismay, because where would they get beams of that caliber nowadays?

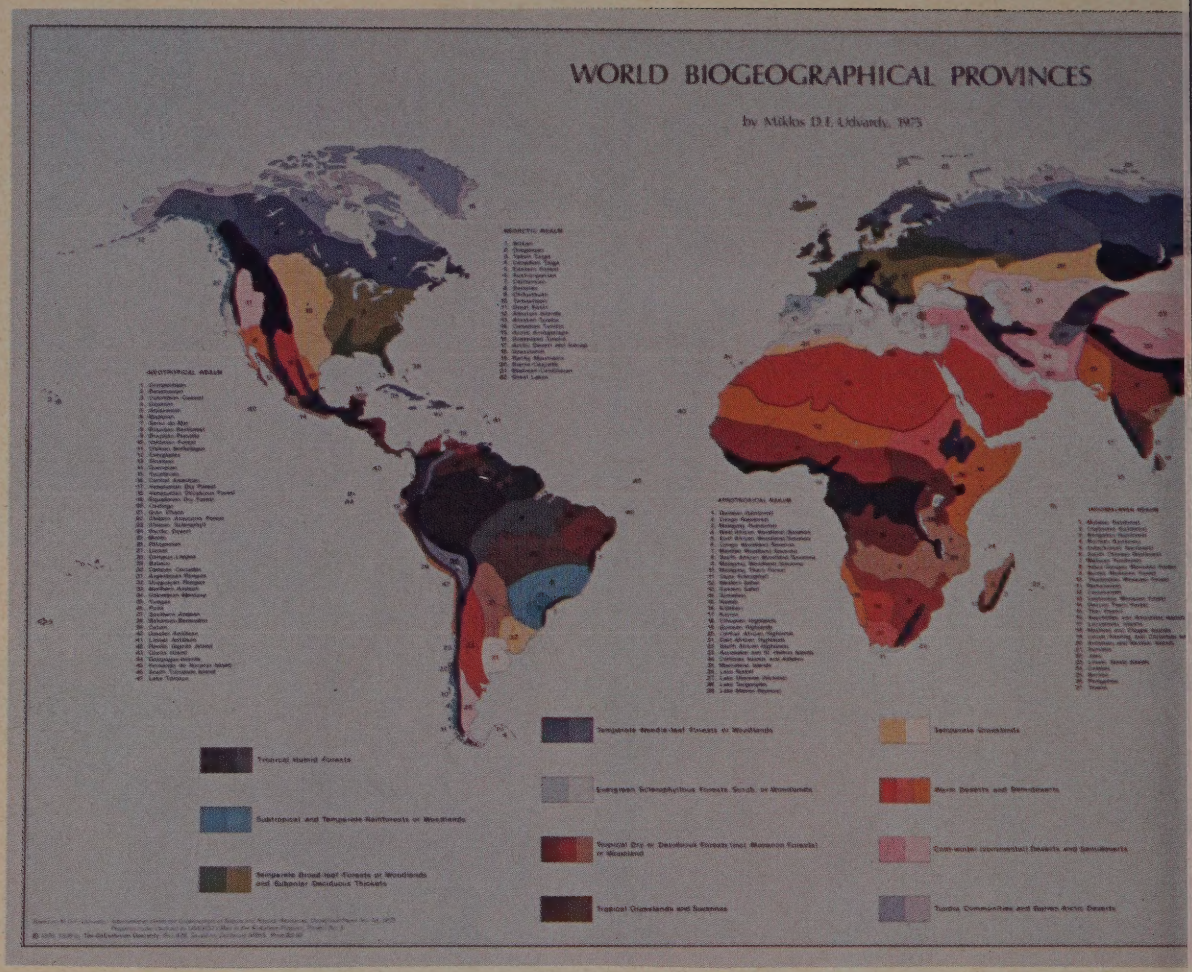
"One of the Junior Fellows stuck his neck out and suggested that there might be on College lands some oak. These colleges are endowed with pieces of land scattered across the country. So they called in the College Forester, who of course had not been near the college itself for some years, and asked him about oaks.

"And he pulled his forelock and said, 'Well sirs, we was wonderin' when you'd be askin'.'

"Upon further inquiry it was discovered that when the College was founded, a grove of oaks had been planted to replace the beams in the dining hall when they became beetly, because oak beams always become beetly in the end. This plan had been passed down from one Forester to the next for four hundred years. 'You don't cut them oaks. Them's for the College Hall.'

"A nice story. That's the way to run a culture."

*—Gregory Bateson*




**World Biogeographical Provinces Map** 22"x39" **$3.50** postpaid (mailed in tube

The world of plants and animals is divided differently than the world of humans. This s the deeper politics. Map by Miklos Udvardy and Ted Oberlander, accompanying article

## Devolving Europe Map

11"x15" **$3** postpaid (mailed in tube)

The once and future Europe, where twenty-eight fiercely different movements for independence or self-rule are forcing political acknowledgement of regional cultural diversity. The phenomenon is worldwide and growing. Map by Bruce McGillivray, accompanying articles by Peter Berg and Jon Stewart.

CQ

Name _____

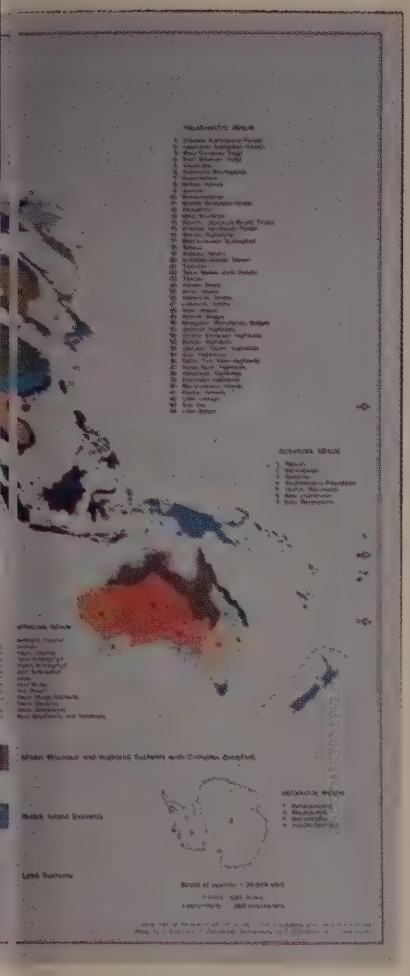
Address _____

City _____

State _____ Zip _____

PLACE
POSTAGE
HERE

CoEvolution Quarterly
Box 428
Sausalito, CA 94966



ific and beautiful map traces
ıy Dasmann.

## CoEvolution T-Shirt

**$8** postpaid

XS (youth's 14-16), S (34-36),
M (38-40), L (42-44), XL (46-48)

Azure Earth, white clouds and
wings on navy blue.
100% cotton (slightly shrinkable).

## Whole Earth Post Cards

**$3** for ten cards, postpaid

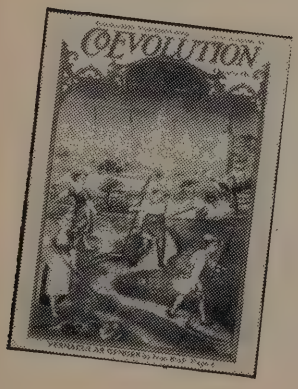
Home sweet home sharply photographed
from the reaches of space. Ten 4"x6" cards
eminently suited for succinct correspondence.

# CoEvolution Quarterly
# Back Issues $3

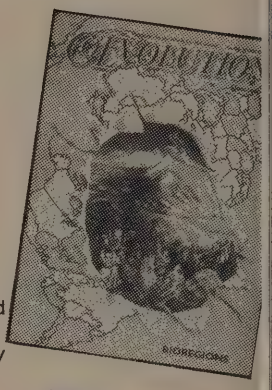
**(except Rare Early Issues)**

**No. 35, Fall 1982.** Articles on "personal national peace-finding," rules of thumb, the native spirit of gift-giving, Gregory Bateson, raw and fanciful Texas talk, and an anti-space adventure.

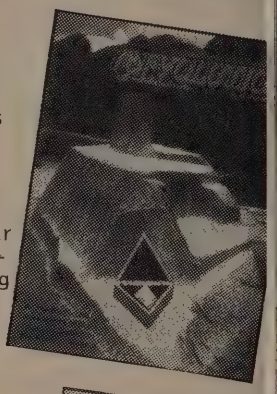
**No. 34, Summer 1982.** Donella Meadows on long-term global modeling, a doctrine of unarmed military service, Admiral Hyman G. Rickover's management philosophy, how and why to work in local politics, Michael Phillips on the persistence of Viking culture in America, Paul Hawken with good news and bad news on the economy.




**No. 33, Spring 1982.** Articles on the nature of gender in our time, including a major piece by Ivan Illich. Also: nonfiction melodrama by Will Baker, Anne Herbert's "Rising Sun Neighborhood Newsletter," "Redefining the Police," and a precis of Paul Hawken (et al.)'s book, **Seven Tomorrows.**

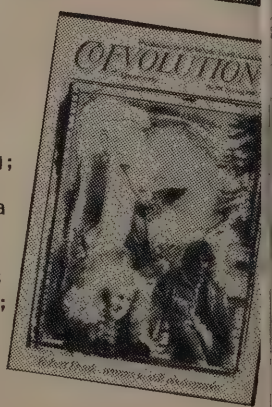



**No. 32, Winter 1981.** Guest edited by Peter Berg and Stephanie Mills. Bioregions Special. Articles on ecopolitical decentralism in the U.S., Europe, and Africa; a report on the forced relocation of thousands of Hopi and Navajo Indians; a chapter from Murray Bookchin's **Ecology of Freedom**; regional bibliographies; and contributions by Jan Morris, Gary Snyder, Molly Ivins, and Wes Jackson.



**No. 31, Fall 1981.** Paul Ehrlich warns social scientists to beware of "physics envy"; James Lovelock elaborates on his Gaia hypothesis. Also, tactics for halting the arms race, Ramon Sender Morningstar and Wavy Gravy on clowning, tree huggers protecting forests in north India and North America, a jogging fantasy, and two looks at the Himalayas.

**No. 30, Summer 1981.** Local politics praised in articles by Karl Hess and Michael Phillips. Inflation exposed as an illusion by Paul Hawken. Also, "How Not to Commit Suicide"; investing successfully with $50 to $5000; making love in space; and coppicing with standards — a method which produces both firewood and timber.

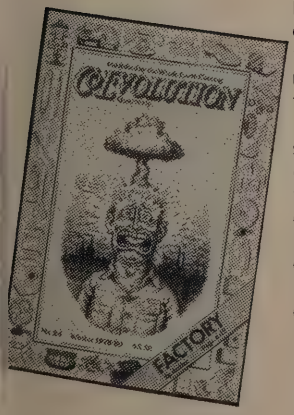



**No. 29, Spring 1981.** Robert Frank's first still photographs in years on the covers and a report on his new movie inside. Articles on computer slang; homeopathy; the life of a secretary; the solar sail as a way to cheap space travel; Deep Springs — a unique alternative college that has been working for 65 years; and disintermediation, the economic process that frees people from inflationary institutions.

**No. 28, Winter 1980.** Guest edited by Anne Herbert. Includes an account of the death of Gregory Bateson by his daughter Mary Catherine; the story of Ed Ricketts, the marine biologist who was the model for John Steinbeck's character Doc; an attack on the evils of circumcision; good news about neighborhood life from the editor and others; Orville Schell on the dangers of feeding antibiotics to livestock; and "Learning to Live with Ambiguity" by Stephanie Mills.

**No. 26, Summer 1980.** Native American running — done over very long distances as an integrated part of life; Ivan Illich on vernacular values; Lynn Margulis on a new theory of how evolution happens; Michael Phillips on "New Age Doctrine Is Out to Lunch on Three Issues: Villages, Recycling, Democracy"; Paul Hawken on "What's Economical?"; and an extensive article on amateur insemination by lesbians.

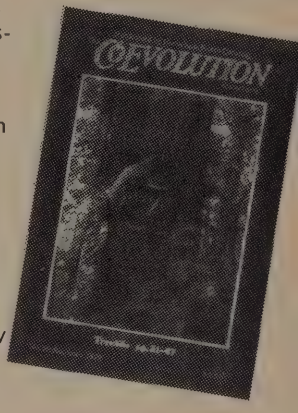
**No. 25, Spring 1980.** Turning back the desert by planting trees; using light rail to revive public transportation; a report on Lynn Margulis' early difficulties and current success as a microbiologist; James Lovelock on being a self-employed scientist; "Our Enemies Our Selves" (on Russia); reader answers to questions about daily life; an article on shramadana — accomplishing community projects in Sri Lanka through sharing human energy; the life and opinions of Nepali Aama, a sensational old lady of the hills of Nepal.



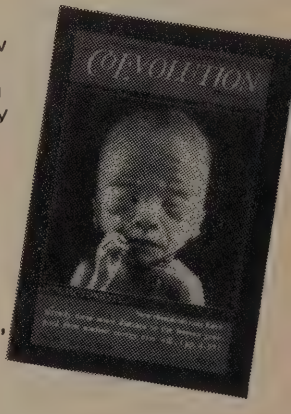

**No. 24, Winter 1979.** The dehumanizing horror of factory work presented in a major poem illustrated on the cover by R. Crumb; how corporate patenting of seeds will cause hundreds of plant species to be lost forever; new wave music explained by insiders and outsiders; articles on how good solar home designs and humane hospital designs existed in the past and were lost to modern "efficiency"; and Gregory Bateson on ending the arms race.

**No. 23, Fall 1979.** Guest edited section by George Putz and Peter Spectre on oceans: John Todd on ocean arks; Phil Conkling models the global carbon cycle; articles on boat restoration, the future of the fishing business and antisubmarine warfare. Plus 30 pages of reviews and access in the Whole Sea Catalog.

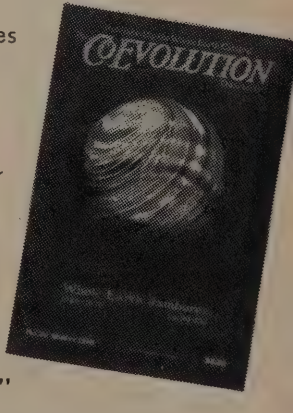
**No. 22, Summer 1979.** Reports on personal computer networks used cross-country for everything from gossip to business conferences to fantasy games; the Oregon women who forced the EPA to ban the herbicides that cause birth defects and miscarriages; the late E.F. Schumacher's belief that tree crops can save British agriculture; and the man who avoided banks and financed his own home by borrowing $10 each from dozens of friends.

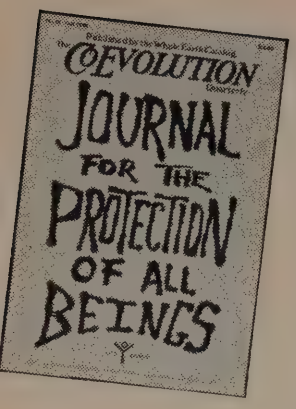



**No. 21, Spring 1979.** How chemicals are harming our genes; Dan O'Neill defying the U.S. Supreme Court by drawing Mickey Mouse; Judy Chicago on "Revelations of the Goddess"; most used magazines reviewed by Nicholas Von Hoffman, Ursula Le Guin, William Irwin Thompson, Margo St. James, Ernest Callenbach, Robert Rodale, and many others.




**No. 20, Winter 1978.** Fifty-six 5-minute speeches by such **CQ** regulars as Theodora Kroeber, Sam Keen, David Brower, George Leonard, Wavy Gravy, Paolo Soleri, J. Baldwin, Ron Jones, Peter Warshall, etc. Also a proposal for immediate world peace, reports on street performing, a self-sufficient solar home, edible landscapes, and excerpts from Anne Herbert's "Rising Sun Neighborhood Newsletter."





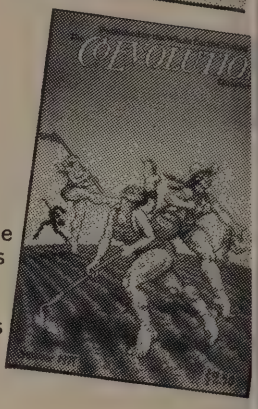

**No. 19, Fall 1978.** An entire issue guest edited by Lawrence Ferlinghetti, Michael McClure, David Meltzer and Gary Snyder, **The Journal for the Protection of All Beings,** includes Allen Ginsberg's "Plutonian Ode," Anne Waldman's "Plutonium Chant," Susan Griffin on the urge to destroy nature and the urge to destroy women, Ishmael Reed on preventing a race war, Lawrence Ferlinghetti's tribute to an imprisoned South African poet, Gary Snyder on the idea of nature in China, Peter Warshall on watching birds on the Farallon Islands and a previously unpublished poem by Jack Kerouac.

**No. 18, Summer 1978.** Thomas Szasz on why no one should be sent to mental hospitals, part of Gregory Bateson's **The Pattern Which Connects,** a special section on space — other countries' space programs, space business, and astropollution; also life in a Mexican jail, street corner stories, and Mimi Farina on entertaining in institutions.

**No. 17, Spring 1978.** How the way you think may cause disease, Wendell Berry debating Earl Butz on what farming should be, Ken Kesey on cops without guns, articles on recombinant DNA as a Good Thing for the environment, how and why to tell your children stories, and off-the-road bicycles.

**No. 16, Winter 1977.** Guest edited section on Broadcast: 4 arguments for the elimination of television, an essay on how the mass media are smothering our capacity to create our own dreams, the stories of 4 lost pioneer broadcast inventors (including Nikola Tesla), Paul Krassner on the hypnotic regression of a television addict, Alvin Duskin on microwave dangers, and Marshall McLuhan talking to Gov. Jerry Brown about cultural change. Also regular **CQ** features and articles on the environmental movement in France, a new kind of wolf in Maine and firefighting in California.

**No. 15, Fall 1977.** How the back to nature movement in Germany in the 20s may have helped pave the way to Nazism, Huey Newton reporting on living in Cuba, articles on new crops for desert areas of the world, starting a Hawksbill turtle hatchery to save the species, what happens at a spiritualist resort, and a nursing home horror story.

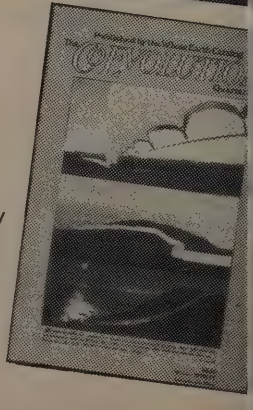



**No. 14, Summer 1977.** Voluntary simplicity analyzed from the viewpoint of spiritual leaders and of businessmen, how astronauts use the bathroom in space, Elisabeth Kubler-Ross, who cares for the dying, tells about the experiences that have made her believe that death does not exist, J. Baldwin reports on wood burning stoves and J.G. Ballard has a science fiction story about an alternative technology future (concluded in Issue No. 15).

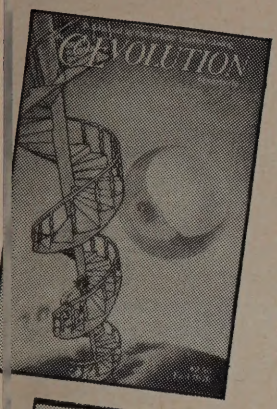
# Rare Early Issues

The following issues are in limited supply, and in most cases have not been available for some time. Quantities on hand are reflected in the prices. Copies of these issues will be mailed in an envelope.

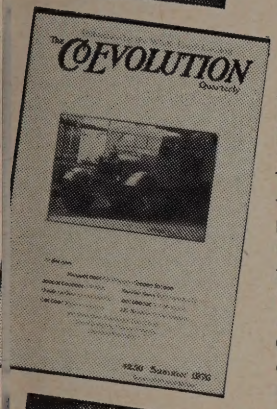
**No. 13, Spring 1977, $5.** How strength of character could lead to running the arms race backwards, Herman Kahn, Jerry Brown and Amory Lovins debate the New Class, how Australian trade unions make green bans work, the most unusual letter we've received, junk stories from a 65 year old addict, and William Burroughs on his Buddhist retreat.



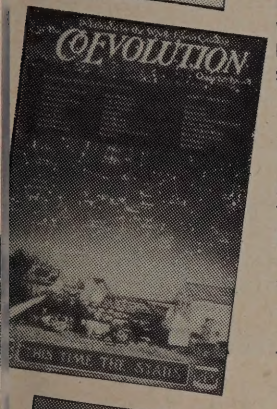

**No. 12, Winter 1976, $25.** The Watersheds Issue. Some of what you need to know about watersheds with asides on Christo's running fence, interspecies music and an interview with Taj Mahal plus a report on the New Alchemy Institute and the first part of "The Acorn People" by Ron Jones (concluded in Issue No. 13).



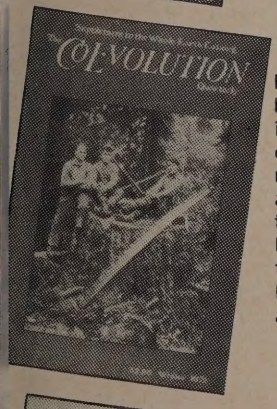

**No. 11, Fall 1976, $10.** Underground architecture as an energy-saving, economic and very pleasant life style, arguments over whether the new data from Mars means there's life there, papers from the mind/body dualism conference, Theodora Kroeber on cross-generational marriage, Ken Kesey on education and Michael Phillips on "The American Anti-Whaling Movement Is Racist."



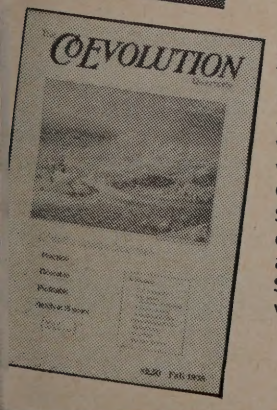

**No. 10, Summer 1976, $5.** "The Man Who Planted Trees and Grew Happiness": the true story of Elzeard Bouffier who singlehandedly planted enough trees to turn a section of France from a desert to a forest; a report on the Hoedads, an Oregon tree-planting cooperative; Ursula Le Guin on menopause and Steve Baer with a reminder that the Bomb is still there and still bad.




**No. 9, Spring 1976, $50.** The 2nd Space Colonies Issue. Responses to and amplifications on the first from a galaxy of **CQ** stars, four poems by Gary Snyder, "Take As Directed" (the Third Wave) by Ron Jones.

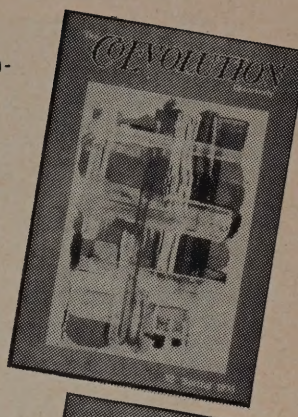



**No. 8, Winter 1975, $25.** How drought was handled in Indian villages, reports on the Ohu communal movement in New Zealand and the early stirrings of the anti-war movement in Europe, first mention of the **CQ** TV show with Marlon Brando and a look at gambling.

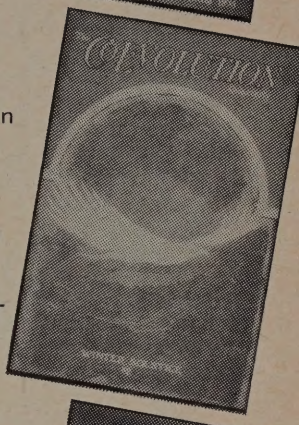



**No. 7, Fall 1975, $50.** The 1st Space Colonies Issue. Gerard O'Neill kicks off the controversy. A wide ranging conversation with Jerry Brown and Gregory Bateson, E.F. Schumacher explains the difference between unity and uniformity and Orville Schell's photo essay on working in China.

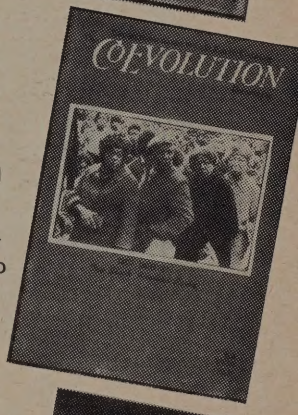
**No. 5, Spring 1975, $25.** R. Buckminster Fuller considers the year 2025, Nitinol springs into view, S.N. Durkee gets an inner-view of the Middle East, and Baker-Roshi gives a sesshin lecture.




**No. 4, Winter 1974, $25.** Lewis Mumford lectures on the energy drain and the next transformation of man, scattered thoughts and a reading list from Gregory Bateson, a special photo spread by Robert Frank of the Canadian Home and "Rich is Beautiful," an introduction to creative philanthropy.

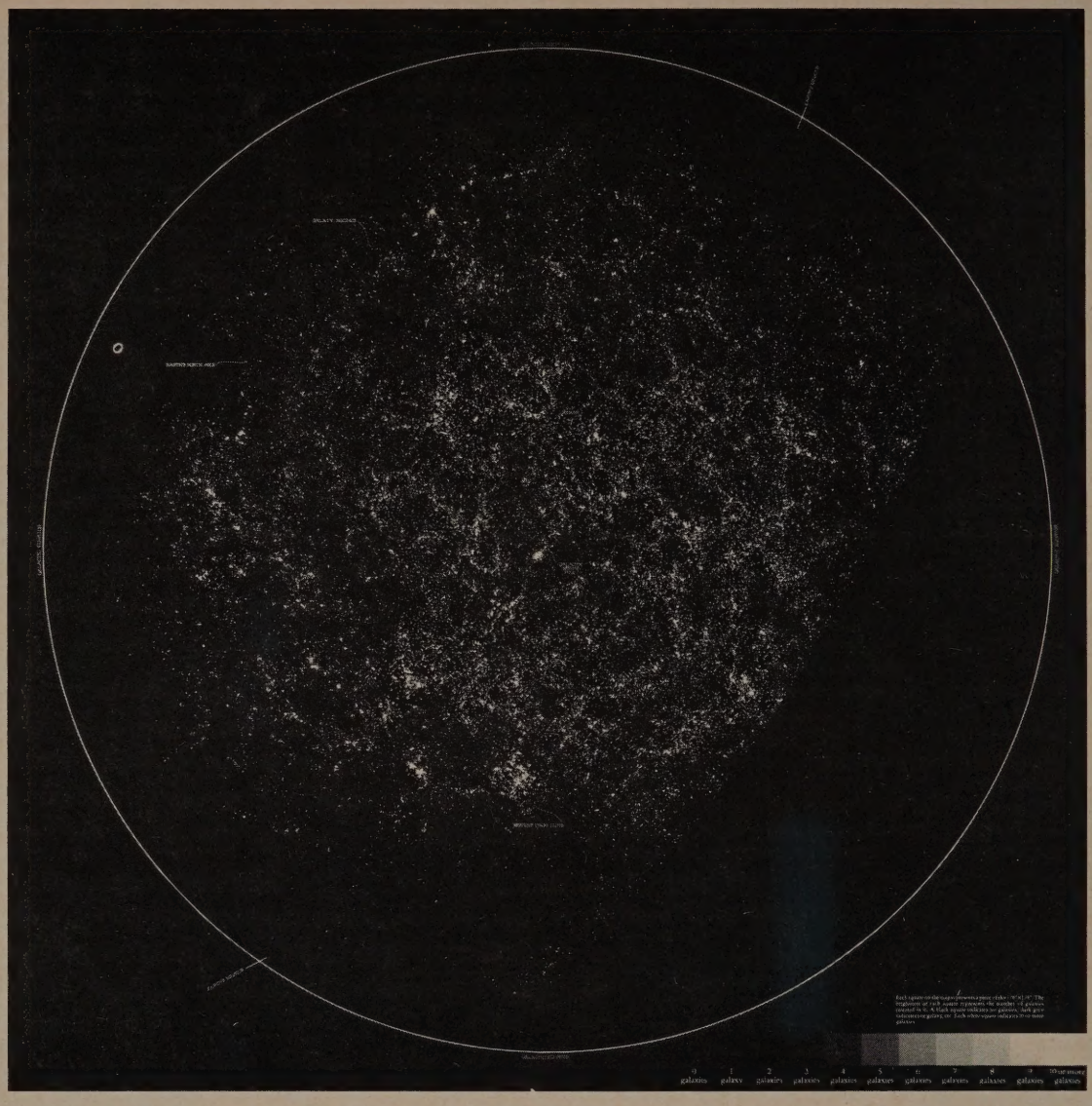



**No. 3, Fall 1974, $25.** Guest edited by the Black Panther Party, a controversial issue with historical value and contemporary relevance. Community organizing and running for public office, a proposal to eliminate the presidency, and the songs of Elaine Brown.




**No. 2, Summer 1974, $5.** Paul Krassner's "Tongue Fu." Paul and Anne Ehrlich on the food shortage crisis, Michael McClure's GORF, and articles on apple picking, bookmaking, and Stephanie Mills running a modern salon.

**No. 1, Spring 1974, $50.** **CoEvolution** surfaces, Paul R. Ehrlich reveals the organic nature of communities, Paul Krassner unleashes "Tongue Fu," an introduction to Buddhism by Rick Fields, and notes on Southwest American Indian Medicine.



# ONE MILLION GALAXIES

## Computer Photo-Map of the Galaxies Brighter than 19th Magnitude Visible from Earth's Northern Hemisphere

This map shows how the galaxies are distributed in our part of the universe—the local one-billion-light-year neighborhood.*

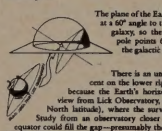
They are the one million brightest galaxies** visible by telescope from Earth's northern hemisphere and the northern hemisphere of our own Milky Way galaxy. Only galaxies are indicated here. Among the nearest is NGC 2403—6,000,000 light years away. The farthest are in the Serpens Virgo cloud (made up of ten galaxy clusters)—1,000,000,000 light years away.

*A light year equals 5,870,000,000,000 miles.

**The faintest galaxies on the map—19th magnitude—are 160,000 times dimmer than can be seen with the naked eye.

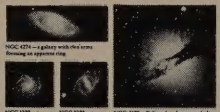
Local debris such as Sun, Moon, planets, asteroids, and the 100,000,000,000 other stars of our galaxy are left out of the map.

The circle of the map shows a different perspective from what we are used to. It is the northern hemisphere *of our galaxy*. The rim of the circle is looking along the thick of our galaxy—not many other galaxies are visible through our dust. The center of the circle is looking straight out from the plane of our galaxy—with the clearer view of other galaxies you would expect.



The plane of the Earth's rotation is at a 60° angle to the plane of the galaxy, so the Earth's north pole points 60° away from the galactic north pole.

There is an unsurveyed crescent on the lower right of the map because the Earth's horizon limited the view from Lick Observatory, California (30° North latitude), where the survey was made. Study from an observatory closer to the Earth's equator could fill the gap—presumably the results would look like the rest of the map.



NGC 4274—a galaxy with dust arms flowing in opposite ring

NGC 1232—a multiple arm galaxy

NGC 3185—a barred spiral galaxy

NGC-3128—Believed to be an exploding galaxy. Why galactic nuclei occasionally explode is still unknown. (It's a very large but dilute event. If our galaxy exploded like would go out.)

Galaxies vary considerably in size and structure. The diagrams at left show an edge-on view of a spiral galaxy like our own. Above are photographs of other typical galaxies.

The Lick Observatory–based survey was made by Donald Shane and Carl Wirtanen using a microscope on 1300 sky photographs, each one 17 inches square. It took them twelve years to complete the survey.

This map made from their data is divided into a million squares, each one representing a patch of sky 1/6°×1/6°. (Horizon over to horizon is 180°.) The grey tone in each square represents the number of galaxies counted in that patch—black for none, dark gray for one, etc., up to white for 10 or more galaxies.

Only when this picture had been made could Shane and Wirtanen stand back and fully appreciate what they had been mapping. The complicated pattern of light and dark areas shows clearly that the galaxies are not smoothly distributed through space—they appear in tight clusters, in curious filaments, and broad clouds across the sky. This is the large-scale texture of the universe.

As galaxies tend to form clusters, the clusters tend to form super clusters, and so on up to an apparent limit of super-super cluster size at about 60,000,000 light years. (No one knows why that is the limit.) The best place to look for a galaxy, Shane and Wirtanen found, is right next to another galaxy.

The galaxy closest to the constellation Serpens is so tight that material appears to flow between the galaxies.

Though it is more comprehensive than anything tried before this map is still crude and local compared to what's possible.

Take the 6°×6° square indicated on the big map—it shows 1800 galaxies here. When Konrad Rudnicki and colleagues at the Jagellonian University in Poland took a deeper survey of that area—counting galaxies four times dimmer than shown here—they found 10,000 galaxies. If they did that for the entire area shown on our map, you might see 6,000,000 galaxies represented.

In that same 6°×6° area the most powerful telescopes on Earth *could* locate 1,000,000 galaxies. The total number of galaxies visible from Earth in both galactic hemispheres may be over 1,100,000,000—one billion one hundred million galaxies.

Telescopes in space will show us a great deal more than that. ■

*—P. James E. Peebles and Stewart Brand*

For further reading see "The Clustering of Galaxies" by J. E. Gunn, P. J. E. Peebles, and J. A. Tinsley, *Science*, Vol. 177, pages 52–59 (1972); "A New Reduction of the Lick Catalog of Galaxies," by M. Seldner, B. Siebers, E. J. Groth, and P. J. E. Peebles, *The Astronomical Journal*, Vol. 82, pages 249–267; and "Two- and Three-Point Correlation Functions for the High Resolution Shane-Wirtanen Catalog of Galaxies," by E. J. Groth and P. J. E. Peebles, *The Astrophysical Journal*, Vol. 217, page 385 (1977).

The maps were made by Bruce Nachers, Melissa Seldner and Rex Sweeney, who were students at Swarthmore College, Swarthmore, Pennsylvania, when they did the work. The data for the maps are courtesy of Seldner, Siebers, Groth, and Peebles, *The Astronomical Journal*, Vol. 82, pages 249–267 (1977). Space Telescope: The diagrams are by Jon Lomberg. Parker, Alpine, New York. Lucas the Wirtanen Catalog of Galaxies," by E. J. Groth and P. J. E. Peebles, *The Astrophysical Journal*, Vol. 217, page 385 (1977).

Lithographed in San Francisco

©1978, 1979 by The Cogitations Quarterly, Box 428, Sausalito, California 94966 Price $5 postpaid (sent in a tube via UPS)

## One Million Galaxies Map

39"x47" **$5 continental U.S.** (elsewhere $7.50) postpaid (mailed in tube)

"On a square yard of glossy black this poster image, profound, enigmatic, beautiful, presents in a clotted tangle of tiny gray squares one abstract but faithful view of the entire thing . . . . No Tantric demon or benign celestial choir provides a more vivid symbol of the vastness of the universe in which we live. "

**—Scientific American**

# GIFT

6355

Name (Please Print) _____

_____

Street _____

City/State _____ Zip _____

**Send gift card from:** _____

## SUBSCRIPTIONS

☐ CQ "LITE" ☐ CQ "DARK"

☐ 1 Year **CoEvolution**
(4 issues) $14
(foreign & Canada $17)

☐ 2 Years **CoEvolution**
(8 issues) $25
(foreign & Canada $31)

☐ This is a renewal

☐ First-class postage, U.S. & Canada: *add $7 for each year.*

☐ Air Mail, *for each year add:*
Mexico & Central America $9.
South America $14.
Europe $14, all others $18.

☐ Back issues $3.
*List by number:* _____

☐ **Next Whole Earth Catalog $12**

**TOTAL GIFT**
$

## CQ PRODUCTS

| Quantity | Size | Description | Amount | |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

Foreign orders must be paid in U.S. funds. If U.S. funds are not drawn on a U.S. bank, add $2 bank surcharge per order.

# GIFT

6356

Name (Please Print) _____

_____

Street _____

City/State _____ Zip _____

**Send gift card from:** _____

## SUBSCRIPTIONS

☐ CQ "LITE" ☐ CQ "DARK"

☐ 1 Year **CoEvolution**
(4 issues) $14
(foreign & Canada $17)

☐ 2 Years **CoEvolution**
(8 issues) $25
(foreign & Canada $31)

☐ This is a renewal

☐ First-class postage, U.S. & Canada: *add $7 for each year.*

☐ Air Mail, *for each year add:*
Mexico & Central America $9.
South America $14.
Europe $14, all others $18.

☐ Back issues $3.
*List by number:* _____

☐ **Next Whole Earth Catalog $12**

**TOTAL GIFT**
$

## CQ PRODUCTS

| Quantity | Size | Description | Amount | |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

Foreign orders must be paid in U.S. funds. If U.S. funds are not drawn on a U.S. bank, add $2 bank surcharge per order.

**METHOD OF PAYMENT:**

☐ Check or Money order

☐ MasterCard or VISA (Min. $10)

Card Account No.: _____ Good Through: ___ - ___

Print Name on Card _____ Signature _____

A fast, easy way to shop is by phone with your credit card. Call us at (415) 332-1717 between 10:00 AM and 4:00 PM, Pacific Standard Time. Sorry, we cannot accept collect calls. Thank you.

**GRAND TOTAL FOR YOU AND GIFTS**

$

# ORDER FORM

CoEvolution

Box 428, Sausalito, CA 94966

SELF ORDER FORM ON BACK COVER

# ORDER FORM

CoEVOLUTION
Box 428, Sausalito, CA 94966

## FOR YOU

Name (Please Print)_____

_____

Street _____

City/State _____ Zip _____

**SUBSCRIPTIONS** ☐ **Next Whole Earth Catalog $12**

☐ CQ "LITE" ☐ CQ "DARK"

☐ 1 Year **CoEvolution** (4 issues) $14 (foreign & Canada $17)

☐ 2 Years **CoEvolution** (8 issues) $25 (foreign & Canada $31)

☐ This is a renewal

☐ First-class postage, U.S. & Canada: *add $7 for each year.*

☐ Air Mail, *for each year add:* Mexico & Central America $9. South America $14. Europe $14, all others $18.

☐ Please leave my name off any rentals of the **CoEvolution** mailing list.

☐ Back issues $3. *List by number:* _____

☐ **Retaining:** $40/year.

☐ **Sustaining:** $100/year.

☐ **Maniacal:** $1000/life.

**TOTAL FOR YOU** $

**CQ PRODUCTS**

| Quantity | Size | Description | Amount |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Foreign orders must be paid in U.S. funds. If U.S. funds are not drawn on a U.S. bank, add $2 bank surcharge per order.

SEE PAGE 15 FOR CREDIT CARD ORDER INFORMATION

*As Gregory Bateson wrote in a Christmas 1967 letter (and in the next CoEvolution), "May the season make sense to you and yours."*

Non Profit Org.
U.S. Postage Paid
San Francisco CA
Permit No. 10286